CLAIM AMENDMENTS

Please cancel claims 42-45, 52-55, 62-65, and 72-75 without prejudice or disclaimer.

Please amend claims 1, 11, 21, 31, 41, 46-47, 51, 56-57, 61, 66-67, 71, and 76-77 as follows.

1. (Currently Amended) A wavelength tunable laser comprising:

a gain means with an active emission section that generates light;

a waveguide including a core, the core optically coupled to the active emission section for receiving light, the core having a refractive index, the core including more than one diffraction grating, each diffraction grating having a different Bragg wavelength, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

a substrate supporting the waveguide and the gain means;

thermo-optical material adjacent to each diffraction grating, the refractive index of the thermo-optical material adjacent to each diffraction grating is less than the refractive index of the core; and

temperature changing means in the thermo-optical material adjacent to each diffraction grating,

the thermo-optical material positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, **[[and]]** or a polymer derived from norbornene.

2. (Original) The laser of claim 1 wherein, when the temperature of the thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is less than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

3. (Original) The laser of claim 2 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or greater than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

4. (Original) The laser of claim 1 wherein, when the temperature of thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is greater than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

5. (Original) The laser of claim 4 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or less than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

6. (Original) The laser of claim 3 wherein the off temperature is in the range of –65° to 100° Celsius.

7. (Original) The laser of claim 5 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 8-10. (Canceled).

11. (Currently Amended) A wavelength tunable laser comprising:

a gain means with an active emission section that generates light;

a waveguide including a core, the core optically coupled to the active emission section for receiving light, the core having a refractive index, the core including more than one diffraction grating, each diffraction grating having a Bragg wavelength, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

a substrate supporting the waveguide and the gain means, the substrate including an index loading region adjacent to each diffraction grating;

thermo-optical material adjacent to each diffraction grating, the refractive index of the thermo-optical material adjacent to each diffraction grating is less than the refractive index of the core; and

temperature changing means in the thermo-optical material adjacent to each diffraction grating wherein the product of a pitch associated with each diffraction grating and an effective refractive index of an optical mode as the optical mode propagates by each diffraction grating is different for each diffraction grating,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, [[and]] or a polymer derived from norbornene

12. (Original) The laser of claim 11 wherein, when the temperature of the thermo-optical material adjacent to each diffraction gratings, except for a chosen diffraction grating, is less than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

13. (Original) The laser of claim 12 wherein, when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or greater than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

14. (Original) The laser of claim 11 wherein, when the temperature of the thermo-optical material adjacent to each diffraction gratings, except for a chosen diffraction grating, is greater than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

15. (Original) The laser of claim 14 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or less than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

16. (Original) The laser of claim 12 wherein the off temperature is in the range of –65° to 100° Celsius.

17. (Original) The laser of claim 14 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 18-20. (Canceled).

21. (Currently Amended) A wavelength tunable laser comprising:

a gain means with an active emission section that generates light;

a waveguide including a core and material within the waveguide, the core optically coupled to the active emission section for receiving light, the core having a refractive index, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

regions of grating in the waveguide, the regions of gratings including thermo-optical material, the refractive index of the thermo-optical material is less than the refractive index of the core;

a substrate supporting the waveguide and the gain means; and

temperature changing means in the thermo-optical material,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, [[and]] or a polymer derived from norbornene.

22. (Original) The laser of claim 21 wherein, when the temperature of the thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is less than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

23. (Original) The laser of claim 22 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or greater than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

24. (Original) The laser of claim 21 wherein, when the temperature of the thermo-optical material adjacent each diffraction grating, except for a chosen diffraction grating, is greater than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

25. (Original) The laser of claim 24 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or less than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

26. (Original) The laser of claim 23 wherein the off temperature is in the range of –65° to 100° Celsius.

27. (Original) The laser of claim 25 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 28-30. (Canceled).

31. (Currently Amended) A wavelength tunable laser comprising:

a gain means with an active emission section that generates light;

a waveguide including a core and material within the waveguide, the core optically coupled to the active emission section for receiving light, the core having a refractive index, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

regions of gratings in the waveguide, the regions of gratings including thermo-optical material, the refractive index of the thermo-optical material is less than the refractive index of the core;

a substrate supporting the waveguide and the gain means, the substrate including an index loading region adjacent to each diffraction grating; and

temperature changing means in the thermo-optical material wherein the product of a pitch associated with each diffraction grating and an effective refractive index of an optical mode as the optical mode propagates by each diffraction grating is different for each diffraction grating,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from

siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, [[and]] or a polymer derived from norbornene.

32. (Original) The laser of claim 31 wherein, when the temperature of the thermo-optical material adjacent to each diffraction gratings, except for a chosen diffraction grating, is less than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

33. (Original) The laser of claim 32 wherein, when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or greater than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

34. (Original) The laser of claim 31 wherein, when the temperature of the thermo-optical material adjacent to each diffraction gratings, except for a chosen diffraction grating, is greater than an off temperature, the magnitude of the light reflected by each diffraction grating, except for the chosen diffraction grating, is insufficient to cause single mode lasing of the wavelength tunable laser.

35. (Original) The laser of claim 34 wherein when the temperature of the thermo-optical material adjacent to the chosen diffraction grating is equal to or less than the off temperature, the magnitude of the light reflected by the chosen diffraction grating is sufficient to cause single mode lasing of the wavelength tunable laser.

36. (Original) The laser of claim 32 wherein the off temperature is in the range of –65° to 100° Celsius.

37. (Original) The laser of claim 34 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 38-40. (Canceled).

41. (Currently Amended) A wavelength tunable filter comprising:

a waveguide including a core, the core having a refractive index, the core including more than one diffraction grating, each diffraction grating having a different Bragg wavelength, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

a substrate supporting the waveguide;

thermo-optical material adjacent to each diffraction grating, the refractive index of the thermo-optical material adjacent to each diffraction grating is less than the refractive index of the core; and

temperature changing means in the thermo-optical material adjacent to each diffraction grating,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, [[and]] or a polymer derived from norbornene.

Claims 42-45. (Canceled).

46. (Currently Amended) The filter of claim [[43]] 41 wherein the off temperature is in the range of –65° to 100 Celsius.

47. (Currently Amended) The filter of claim [[45]] 41 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 48-50 (Canceled).

51. (Currently Amended) A wavelength tunable filter comprising:

a waveguide including a core, the core having a refractive index, the core including more than one diffraction grating, each diffraction grating having a Bragg

wavelength, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

a substrate supporting the waveguide, the substrate including an index loading region adjacent to each diffraction grating;

thermo-optical material adjacent to each diffraction grating, the refractive index of the thermo-optical material adjacent to each diffraction grating is less than the refractive index of the core; and

temperature changing means in the thermo-optical material adjacent to each diffraction grating wherein the product of a pitch associated with each diffraction grating and an effective refractive index of an optical mode as the optical mode propagates by each diffraction grating is different for each diffraction grating,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, **[[and]]** <u>or</u> a polymer derived from norbornene.

Claims 52-55. (Canceled).

56. (Currently Amended) The filter of claim **[[52]]** <u>51</u> wherein the off temperature is in the range of –65° to 100° Celsius**[[,]]**.

57. (Currently Amended) The filter of claim **[[54]]** <u>51</u> wherein the off temperature is in the range of –65° to 100° Celsius**[[,]]**.

Claims 58-60. (Canceled).

61. (Currently Amended) A wavelength tunable filter comprising:

a waveguide including a core and material within the waveguide, the core optically coupled to **[[the]]** <u>an</u> active emission section for receiving light, the core having

a refractive index, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

regions of gratings in the waveguide, the regions of gratings including thermo-optical material, the refractive index of the thermo-optical material is less than the refractive index of the core;

a substrate supporting the waveguide; and

temperature changing means in the thermo-optical material,

the thermo-optical material being positioned in proximity to the phase control section and temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, [[and]] or a polymer derived from norbornene.

Claims 62-65. (Canceled).

66. (Currently Amended) The filter of claim [[63]] 61 wherein the off temperature is in the range of –65° to 100° Celsius.

67. (Currently Amended) The filter of claim [[65]] 61 wherein the off temperature is in the range of –65° to 100° Celsius.

Claims 68-70. (Canceled).

71. (Currently Amended) A wavelength tunable filter comprising:

a waveguide including a core and material within the waveguide, the core optically coupled to [[the]] an active emission section [[fro]] for receiving light, the core having a refractive index, the core having a diffraction grating-free portion, the diffraction grating-free portion including a phase control section;

regions of gratings in the waveguide, the regions of gratings including thermo-optical material, the refractive index of the thermo-optical material is less than the refractive index of the core;

a substrate supporting the waveguide, the substrate including an index loading region adjacent to each diffraction grating; and

temperature changing means in the thermo-optical material wherein the product of a pitch associated with each diffraction grating and an effective refractive index of an optical mode as the optical mode propagates by each diffraction grating is different for each diffraction grating,

the thermo-optical material being positioned in proximity to the phase control section and the temperature changing means in the thermo-optical material positioned in proximity to the phase control section, the thermo-optical material being ~~selected from the group comprising~~ a polymer derived from methacrylate, a polymer derived from siloxane, a polymer derived from carbonate, a polymer derived from styrene, a polymer derived from cyclic olefin, **[[**and**]]** or a polymer derived from norbornene.

Claims 72-75. (Canceled).

76. (Currently Amended) The filter of claim **[[**72**]]** 71 wherein the off temperature is in the range of –62° to 100° Celsius.

77. (Currently Amended) The filter of claim **[[**74**]]** 71 wherein the off temperature is in the range of –62° to 100° Celsius.

Claims 78-80. (Canceled).